THE *Soybean Digest*

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Season's Greetings

May Yuletide blessings make life sweeter for you and yours wherever they are. It is the deepest wish of all that we may put war's holocaust behind us and henceforth work with our fellow men at the pleasant pursuits of peace.

The Staff of
THE SOYBEAN DIGEST

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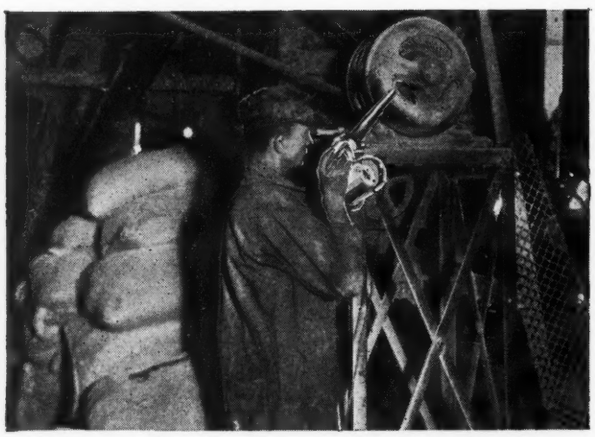

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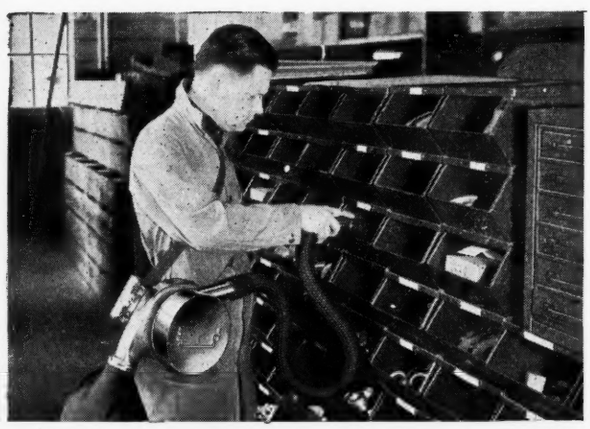

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BROTHER, THIS JOB IS UP TO YOU!

The October issue of the *Soybean Digest* carried an editorial entitled "Quit Starving Soybean Research!" Following publication, marked copies of the issue were sent to directors of agricultural experiment stations in the major soybean producing states, asking for comments, criticisms, suggestions.

Replies have reached us from most of the experiment station directors. Comments varied from hearty endorsement to vehement criticism. There were those who thought we were totally unfair and those who indicated concurrence that soybean research must be stimulated greatly. There were directors who suggested that soybeans were receiving more than their share of research money, and those who welcomed the suggestion that growers in their states promote additional state funds for such work.

A blanket criticism of the lack of adequate investigation of soybean research problems in all states must of necessity do injustice in specific cases. Likewise, it can not be severe enough in its criticism of the programs in other states. Adequacy of research is relative.

One thing was agreed upon by all experiment station directors replying. That was that when soybean producers use their influence in state and national legislative halls to insure increased funds for soybean research work, the experiment stations will plan and execute the programs as outlined by those growers.

Direct quotations from some of the letters received in reply from experiment station directors follow:

"It is my responsibility to see that some sense of perspective is maintained in our research program with different industries. So far as this state is concerned, soybeans are getting their share. It may be a starvation ration as your editorial suggests, but it is less of a starvation ration than is dealt out to many other interests. When soybean interests see that we obtain the funds for additional research then we can expand our program. . ."

"I liked your editorial. . ."

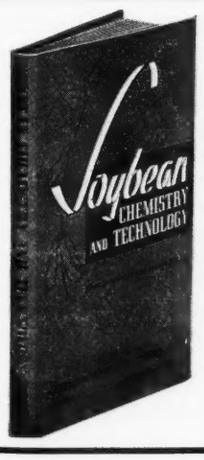
"We are sympathetic with your views that soybean research should be increased. You must realize, however, that the budget of the experiment station is set by the legislature, supplemented by such funds as we obtain from Congress and funds given to the University for specific research by industrial companies. . ."

"If your editorial helps in awakening our people to the fact that if they want research in soybeans they will have to provide funds for it, the editorial will have been worthwhile. . ."

"You have rendered a service to the soybean industry in calling attention in the editorial to the need of soybean research. . ."

"The fact is that current funds going to study of soybeans are more generous than for the study of any crop other than corn. . . Where did you get your 'one-man' information?. . . Your letter and the editorial both contain statements that are quite untrue. . . Increased emphasis in the past year and at present is in spite of the fact that the legislature did not increase the appropriations to the station by one cent."

The job to be done still lies with you and you and you. If soybean research is to be increased at state experiment stations the funds must be allocated by the legislatures. That job, within your state, is up to you as soybean growers, handlers and processors. *Now* is the time to do it.



Soybean Chemistry and Technology . . .

by KLARE S. MARKLEY

Principal Chemist, Southern Regional Research Laboratory; Formerly Senior Chemist, U. S. Regional Soybean Industrial Products Laboratory

and WARREN H. GOSS

Senior Chemical Engineer, Northern Regional Research Laboratory; Formerly Senior Chemical Engineer, U. S. Regional Soybean Industrial Products Laboratory.

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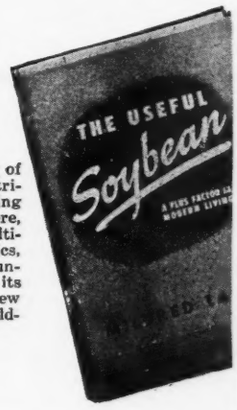
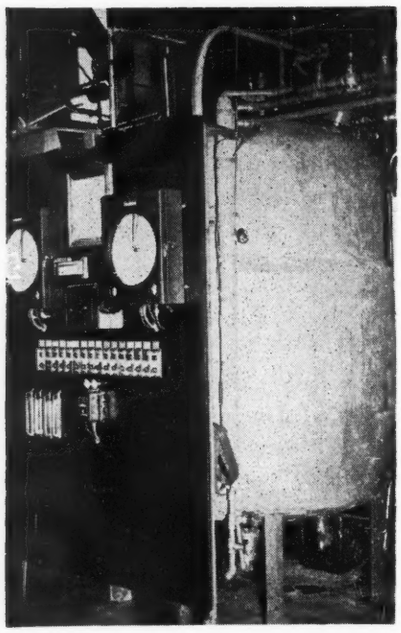




Polymerization equipment used in General Mills polyamide resin manufacture.

RESEARCH -- the Key

to the Economic Stability of the Soybean Industry*

By RALPH H. MANLEY

THE STORY of the amazing growth of the soybean industry and of the great increase in soybean production during recent years is well known. The literature of the period reveals, however, that while agronomic phases of soybean research have for the most part kept pace with the increasing importance of the industry, only in the last few years has research on the utilization of the soybean, and the commercial adaptation of that research come into real prominence. Results of this expanding research program now indicate the attractive future which lies ahead for growers of soybeans and users of soybean products.

That we still have a long way to go, however, is shown by the fact that only about 20 percent of the soybean oil and meal processing industry uses the solvent method of oil extraction. About 80 percent of the industry still uses hydraulic or screw press equipment. During the past year alone, some 245 million pounds of soybean oil were left in the soybean oil meal. This represents an economic loss of more than 23 million dollars, the difference in market value of the oil sold in feed and the value which it would have had if it had been extracted and sold as soybean oil. If recovered, it could have found higher use in vegetable shortenings and salad oil to help feed the world's population, or it might have been used in protective coatings for our cars, farm equipment and buildings. While it is true that farm animals utilize the oil left in the soybean oil meal, whole corn is almost always a cheaper source of vegetable oil required in the animal diet. Furthermore, some farmers still feed whole soybeans to their stock despite the fact that the protein in whole soybeans is less than half as efficient nutritionally as is a properly processed soybean oil meal. Feeding whole soybeans may be good economics from an individual farmer's point of view, but it certainly is not sound economics from the viewpoint of the country as a whole.

The nutritional value of soybean oil meal has been the subject of intense industrial research during the past few years. Such able research workers as D. Breese Jones, James W. Hayward, and Helen Parsons, among others have shown that carefully controlled heat treatment tremendously increases its nutritional value. This heat treatment applies equally well to expeller soybean oil meal and to solvent extracted soybean oil meal, the only difference being that in the extraction process the meal is heat-treated in a separate controlled operation after the oil has been removed, whereas in the case of expeller meal the heat treatment takes place incidentally to the pressing of the oil from the beans. Soybean processors have spent a great deal of time and money on the study of this protein heat treating problem, and the more progressive processors have developed controls which yield a uniform meal of maximum feed value, far above the nutritional value of the protein in the raw soybeans. Nutritionally, soybean oil meal heads the list of vegetable protein concentrates for all around use.

Soybean oil meal as produced for animal feed contains from 41 to 44 percent of protein, depending upon the process employed. By removal of the more fibrous portion of the beans, and by extracting the oil and removing the solvent at a controlled low temperature, an industrial product of 53 percent to 55 percent protein can be produced rather cheaply. Such a soybean protein has been manufactured for several years. It is also possible to remove the objectionable water-soluble sugars and salts from the crude soybean protein, thus increasing its protein content to about 65 percent.

This improved type of industrial soybean protein should have a good future in the adhesives industry and in the manufacture of water-emulsion paints and paper coatings. General Mills is now producing this protein in pilot plant quantities in order to develop the necessary plant design and "know-how" for production now the war is finally over and processing equipment will be available. Also, millions of pounds of a more highly purified soybean protein were produced for wartime use in fire-fighting foams and in adhesives. The spray-dried water-soluble fraction of soybean oil meal is also being produced as an extender and partial replacement for egg albumin. All of this suggests that the protein from soybeans has found a secure and expanding position in American industry.

GLIMPSE INTO CHEMISTRY

Any discussion of the utilization of soybeans requires a brief glimpse into the chemistry of its oil constituents. Soybean oil is essentially a mixture of five different fatty acids, all linked together with glycerine to form compounds known as glycerides. Two of these fatty acids, present in soybean oil to the extent of 15 percent, are stearic and palmitic acids. These acids, which are white crystalline solids, have no drying properties whatever, and are therefore of no value in drying oils. They are, however, essential ingredients used in the manufacture of such products as rubber tires, lubricating greases, and cosmetics. Another of the fatty acids of soybean oil is oleic acid. Approximately 23 percent of soybean oil

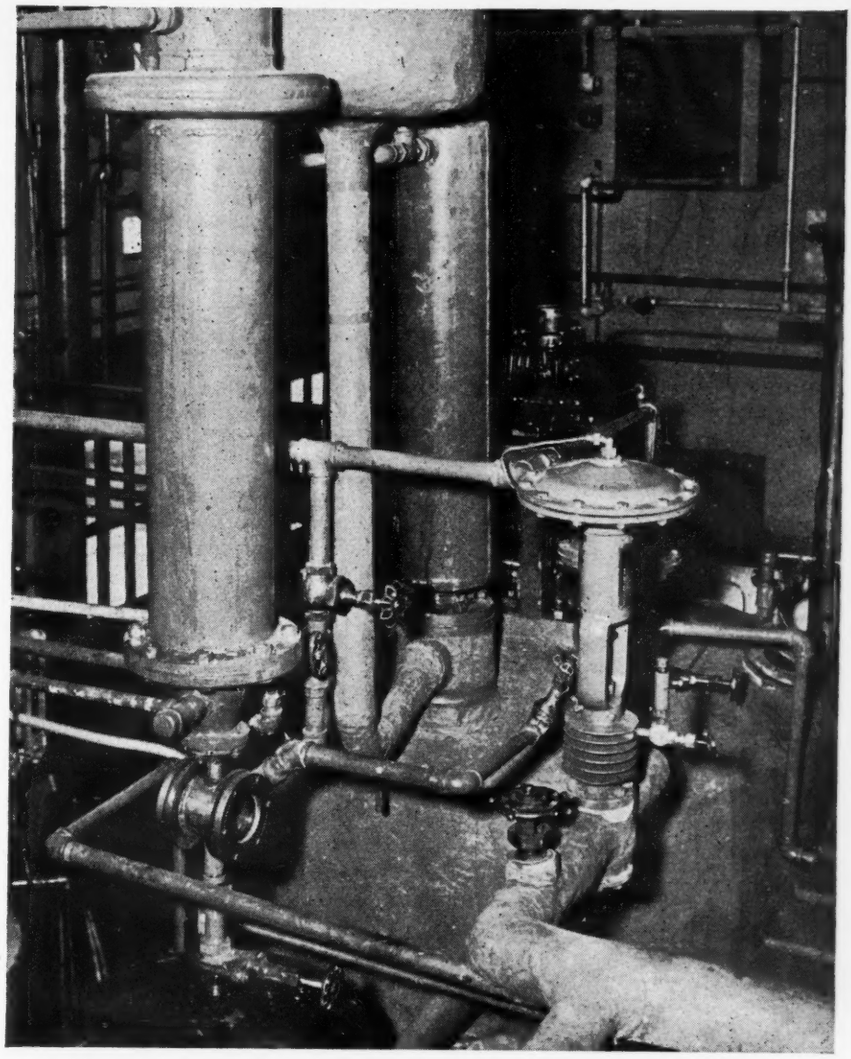
*Paper No. 68, Journal Series, Research Department, General Mills, Inc.

consists of this acid which takes the form of a clear liquid. Like stearic acid, it has no drying properties, but does have great industrial value in textile detergents, cutting oils, and liquid soaps. The two remaining important acids of soybean oil are linoleic acid (55 percent) and linolenic acid (7 percent). These two are true drying oil acids, and are largely responsible for the usefulness of soybean oil in protective coatings, in oil cloth and linoleum, and in synthetic resin manufacture.

THE VITAL QUESTION

It is clear from the above that potentially, soybean oil can be made to serve in a multitude of valuable commercial applications, and it is equally clear that it is technologically inefficient to use whole soybean oil in paints, varnishes and resins where air drying is all-important. American soybean growers and their industrial partners, the soybean processors, produced about 1,219,000,000 pounds of soybean oil during the 1943-44 crop year — certainly a fine contribution to the war effort. Of this amount, the largest share properly went into food products where all of the fatty acid components of soybean oil were nutritionally effective. However, the question of the best economic use of soybean oil is of great concern to us. Were the palmitic and stearic acids separated and put to their greatest usefulness in making rubber tires and lubricating greases? Was the oleic acid isolated and used to its greatest advantage? Were the remaining linoleic and linolenic acids, greatly enhanced in drying value by the removal of the non-drying acids, then used for the manufacture of critically needed drying oils, lacquers, and synthetic resins? It is not necessary to elaborate on the negative nature of the answer to all of these questions, nor to explain that the necessary equipment was not available until the war was won in the Pacific.

Now that we have shown a few potentialities of soybean oil utilization, let us look briefly at some of the results of recent industrial and government research which already has shown promise in bringing these possibilities to commercial application.



Aminolysis reactor used in General Mills polyamide resin manufacture.

• *Application of new technics in utilization of soybean oil and protein will expand rapidly as soon as the processing equipmnet is available, says the author who is in charge of chemical research for General Mills, Inc. This is the second of a series of articles on industrial research being published in the* SOYBEAN DIGEST. *The first appeared in November.*

In 1942, the Northern Regional Research Laboratory of the U. S. Department of Agriculture at Peoria, Ill., announced the discovery that the polymerized linoleic and linolenic acids of soybean oil could be chemically linked together through ethylene glycol to form long, vulcanizable, elastic polyester molecules, and suggested that the product, called Norepol, might be a useful rubber substitute during the war emergency. The chemistry of Norepol was sound, and the need for replacements for rubber was pressing, but the demand for soybean oil at that time for food was far greater, and no more than a few hundred tons of Norepol were ever manufactured. However, the effort was not in vain as out of this work came a new concept in fatty acid chemistry, and by 1943 the government laboratory at Peoria announced a new synthetic resin from soybean oil called Norelac. It was made by chemically linking together the polymerized linoleic and linolenic acids of soybean oil through ethylene diamine to form long chain polyamide molecules. The product is a hard, brittle, fusible resin rather than an elastic rubber-like body as in the case of Norepol. General Mills is now manufacturing Norelac polyamide resin at Minneapolis for use in paper coatings and hot dip compounds for protecting precision metal parts from corrosion. The inherent heat stability, alkali-resistance, and adhesive properties of this soybean oil polyamide resin indicate that the Peoria laboratory has made a substantial contribution to soybean oil technology, and that the new resin has a secure place in postwar industry as a coating for paper and foils, as a wood sealer, and as a heat-sealing and laminating adhesive.

Mention has been made of the fatty acids comprising soybean oil and of their comparatively greater value when separated from each other. Research on an economical separation or fractionation of these acids has indicated several possible methods which may be employed. Fractional distillation similar to that used in the petroleum industry is effective in removing the color from mixed soybean oil acids and in separating the palmitic acid from the others. But it is of less value in separating the

stearic, oleic, linoleic and linolenic acids from each other as their boiling points are only a few degrees apart. One of the effective methods of doing this, now in the pilot plant stage of development, is fractional crystallization. In this method, the mixed acids are dissolved in a suitable solvent such as acetone and then chilled. Postwar, we may expect to see one or more large fatty acid plants producing purified fatty acids at the rate of millions of pounds a year, probably based on a combination of the distillation and low temperature crystallization technics. Such a move on the part of industry will do much to stabilize and strengthen the position of soybean culture in American agriculture.

ATTRACTIVE POSTWAR USE

One of the attractive postwar uses of concentrations of the drying oil acids of soybean oil is in the production of synthetic drying oil esters. As has already been mentioned, soybean oil by itself does not have a sufficiently high content of the drying oil linoleic and linolenic acids to be efficient in air drying protective coatings and, therefore, requires some chemical modifications to be most useful in paints and varnishes. Because it has a low content of the linolenic acid which causes yellowing of interior enamels, soybean oil has been used in large volume in such finishes by chemical combination in alkyd and phenolic resins, wherein the lack of drying power of the palmitic, stearic and oleic acid components of the oil is overcome by polymerization during the formation of the resin. Another method of overcoming the lack of drying power in whole soybean oil, just now beginning to receive widespread attention, is to replace all or part of the glycerine in the mixed soybean glycerides by such higher polyhydric alcohols as pentaerythritol, sorbitol and polyallyl alcohol. Although such synthetic drying oils still contain all of the nondrying acids of the original oil, the larger molecules so formed are so much more sensitive to air drying that they yield excellent fast drying paints and varnishes. The postwar future of such resynthesized drying oils will depend upon the cost and availability of the polyhydric alcohols, the cost of distilled and fractionated fatty acids, and upon the prices of other competitive oils.

It is safe to say that all of these new technics in the utilization of soybean oil and soybean protein are here to stay, and that their application in industry will expand rapidly as soon as processing equipment is again available. There is a definite upper limit to the amount of soybean oil and meal — or any other product for that matter — that can be consumed for food or feed purposes regardless of its merit. There would seem to be almost no limit to the amounts of specialized products from soybean protein and soybean oil that can be absorbed by industry.

TAKE SUBSIDIES

Growers, Handlers and Processors Discuss 1946 Soybean Production Program with USDA Representatives in Chicago.

Subsidies should be removed on the 1946 soybean crop, but this must be accomplished without a deep cut in acreage. This was the general agreement reached at an open meeting for discussion of the 1946 soybean production program held in Chicago November 13.

The exact method which might be used for achieving this result was left unsettled. Nor was any definite statement forthcoming from government representatives concerning a probable support price. Prices mentioned ranged from $1.75 to the present floor of $2.04. The general feeling was that some reduction in acreage might be expected next year even if the present support price should be continued.

Representatives of the American Soybean Association, Farm Bureau, Triple-A, the National Soybean Processors Association, warehousemen and leaders from the University of Illinois were present.

Geo. D. Bradley, regional director of Commodity Credit Corporation, Chicago, presided. W. H. Jasspon, head of the fats and oils branch, represented Production and Marketing Administration of the U. S. Department of Agriculture.

Jasspon made it clear that USDA policy is to remove subsidies on all agricultural products including soybeans as rapidly as possible. This may be accomplished either by a lower support level or by the removal of existing ceilings on soybean products. The latter action, he pointed out, will be up to Congress when the present price control act expires in June.

Jasspon expressed considerable uncertainty about the prospect for fats and oils in the period just ahead, due to the world situation. "What the demand for export will be no one can say. For safety's sake, we shouldn't do anything that will reduce soybean acreage."

President Howard L. Roach, Plainfield, Iowa, speaking for the American Soybean Association, said that in general farmers want the subsidy removed. He presented the following points as being in line with the thinking of board members of the Association and a large number of representative growers in leading soybean producing states who had been contacted:

"1. It is desired that subsidies be removed as far as possible from the structure of prices paid for agricultural products. Agriculture knows that sooner or later public demand exerted through legislative channels will lower or remove subsidies, and is fearful this will happen when farm prices are declining. If subsidies are removed while prices are high, farmers' income will not be hurt as it might were the subsidy removed when his overall income is low.

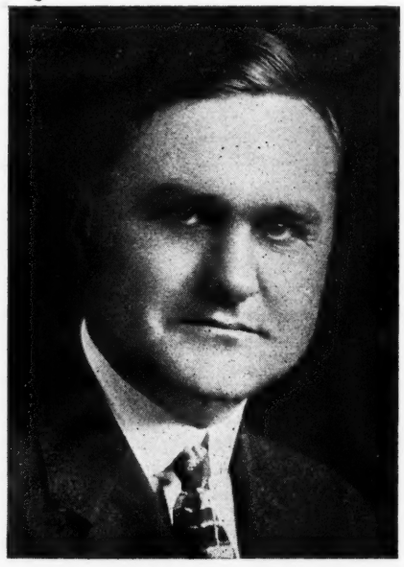
"2. Soybean producers are not in favor of the removal of price controls which would inevitably cause further inflation. The inflation and deflation following World War I have not been forgotten.

"3. Since we are in favor of repealing subsidies and do not want to see the policy of holding ceiling prices abandoned, we will be willing to take a price for soybeans in 1946 of $1.80 per bushel, which is the round figure that can be paid providing the subsidy is eliminated and ceilings hold. We realize this will entail a cut of approximately 20 percent in 1946 acreage under 1945 acreage.

"4. Some pressure groups are anxious to see ceiling prices revised upwards on commodities they own. If that school of thinking gets action by our government, soybean producers will want the opportunity to share in these increased prices. Farmers feel that ceiling prices should not be placed on the soybean crop itself. Ceilings on soybean oil and oil meal will control the price which the processors pay for soybeans.

"5. Concern is felt by feeders who are also soybean producers about the supply of vegetable protein. An increase in the ceiling of soybean oil meal of, say $5.00 per ton,

L. J. NORTON
"Comparable price is too low."



OUT!

would enable the support price for soybeans to be increased and this would materially affect the acreage planted in 1946. Such an increase would place the soybean oil meal price more nearly in line with the price of other protein feeds and would not seriously curtail the demand. An increase in the ceiling price on soybean oil, allowing it the same price as cottonseed oil, would have the added effect of allowing processors to pay more for soybeans and would further increase the floor price possible. While increasing ceiling prices on oil meal and oil would appear to contradict the policy stated in Point 2, there is no doubt that soybean oil meal has been under-priced since OPA set the ceiling, considering the value of the product. The same is true of soybean oil.

"6. Policies and rulings which enable soybeans to sharply increase in price after they have left growers' hands bring dissatisfaction and do not keep the producer in the frame of mind which will keep him planting the acreage which industry is hopeful of holding. Producers should be informed exactly what policies are and how rules work in order that there shall be no misunderstanding."

TREND IN ILLINOIS

Geo. H. Iftner, director of grain marketing for the Illinois Agricultural Association, Chicago, reported a trend toward a smaller soybean acreage in Illinois. He said he had telegraphed growers in 25 representative counties. Replies indicated that an acreage reduction ranging from 15 to 35 percent might be expected in Illinois if the support price should be lowered to $1.70. County-wide surveys reported by Farm Bureau leaders indicated the same trend.

That the "comparable" price for soybeans is not in reality a fair price, was pointed out by Dr. L. J. Norton, professor of agricultural economics at the University of Illinois. He stated: "It should be borne in mind that the 'comparable price' of soybeans was set at a lower ratio to the 'parity price' of corn than is warranted by comparative costs or acre yields. In order to induce heavy soybean production the price of soybeans must be kept well above the 'comparable price', as was done during the war."

Norton said that the Illinois College of Agriculture had suggested a tentative goal for 1946 of 3,100,000 acres in Illinois, compared to 3,600,000 acres expected to be harvested in 1945. This figure was based on the assumption that "prices are expected to remain or be maintained at about the 1945 level." For a long range goal, the College has recommended an annual acreage of 2,740,000 of soybeans for beans, after a careful study of soil and other agricultural resources.

Dr. W. L. Burlison, head of the department of agronomy, University of Illinois, made a statement concerning that state's soybean acreage, which had been prepared by himself and J. C. Hackleman, extension agronomist, as follows:

"1. Better farmers throughout the state are realizing the effect upon the soil of almost continuous cropping to corn and soybeans. These folks are planning to reduce the amount of row crops, and soybeans will probably be the first one reduced.

"2. Due to the patriotic appeal many farmers west and north of the Illinois River have included soybeans in their farming program for the first time. These two areas are heavy livestock-producing regions. Many farmers expect to drop soybean production entirely at the first opportunity. They will substitute small grains.

"3. Thousands of Illinois farmers have applied limestone and phosphate during the past 3 or 4 years and have not yet found it possible to seed any legume on these treated fields because of the urge to maintain soybean and corn production. These folks are especially anxious to capitalize on the soil treatment that they have applied.

"4. Farmers who study their records feel that in order for soybeans to be comparable with their corn crop the price of corn should be multiplied by approximately 2¼ to make the returns about the same.

"5. The attempt to meet goals in soybean production with inadequate labor and machinery has resulted in a striking increase in the amount of weeds maturing a seed crop on Illinois farms. Farmers are anxious to attempt a weed control program where they can mow meadows and pastures and destroy as much of the infesting weed crop as possible.

"6. The above applies primarily to the dark soils. On the lighter soils of southern Illinois and in some of the overflow areas along the river in that section, farmers have learned that soybeans will adjust to extremely late planting, to relatively dry periods during the growing season, and make as satisfactory or possibly better yields than existing varieties of corn. In this area, which covers about one-fourth of the state, soybean acreage will, I believe, be maintained and possibly increased."

There was some expressed sentiment in favor of leaving the 1946 market entirely free, with the removal of ceilings on soybean oil and oil meal.

Jasspon would make no forecast of the date when the government's 1946 soybean program might be announced. The meeting was clearly an attempt by USDA officials to get "grass-roots" sentiment before making final decisions on the 1946 program.

A Look at the Future of Soybeans

By HOWARD L. ROACH
President American Soybean Association

From speech before Western Grain & Feed Association, Des Moines, Iowa, November 26.

There is considerable speculation on the part of producers, processors and consumers about the future of soybeans in the United States. While I am no prophet—and neither am I the son of a prophet—I shall try to give you the results of some of the progressive and conservative thinking on this subject that is being voiced today.

During the war our federal government felt it necessary to place a floor under soybeans in order to encourage their production.

The producers responded to patriotic appeals. Being insured of a floor price, the soybean acreage in Iowa increased from 709,000 acres which produced 14,180,000 bushels of beans in 1940 to 1,984,000 acres which produced 34,290,000 bushels in 1945. This is an increase of almost 300 percent in acreage and an increase of 250 percent in beans harvested.

The thinking now on support prices is not so much about encouraging the production of soybeans for their valuable oil content as it is to encourage production of soybean oil meal. It is the desire to encourage the production of soybeans in order that the livestock industry of the nation will be supplied with enough protein.

Soybean oil meal has been the bargain protein feed throughout the war period. Many mixers have been forced to substitute other oil seeds and animal proteins with soybean oil meal — until some rations on the market today are but glorified soybean oil meal. These same mixers have found that instead of deteriorating the quality of their mixed feed they have improved it.

In the period before the war the United States was a large importer of flaxseed from South America. The flaxseed was pressed in this country to supply our farmers with linseed oil and linseed oil meal. The oil chemists have now discovered new methods of processing soybean oil until processed soybean oil is fully as good, and in some respects better, than linseed oil. Every effort is being made by the government to encourage flax production for 1946. However, due to low yields, climatic factors and other reasons, we probably will never have the flax production nor the flax importation we once had. Some other oil seed crop will have to supply the drying oil and proteins that this grain once supplied. I need not tell you

gentlemen how soybean oil meal can be substituted for linseed meal. You have learned that fact yourselves.

For many years the acreage devoted to cotton in the United States has been on the decline. This is due to the development of synthetic fibers which take the place of the cotton fiber. Expanded cotton acreage in other nations and areas able to grow cotton has also been a big factor in our diminishing cotton acreage. Many experts predict we may see a further decline in cotton.

PROFITABLE PRACTICE

From the seeds of the cotton crop we have obtained cotton seed oil and cotton seed meal. Soybean oil is now substituting in almost every case for cotton seed oil. Livestock men have learned that soybean oil meal can replace cotton seed meal in animal rations. We probably can expect that soybean oil meal will have to supply the place occupied by cotton seed meal to a greater and greater extent in the future.

True it is that with a decline in livestock, dairy and poultry prices, the demand for protein feeds will not be so active. However, many farmers have learned that the inclusion of protein in the rations of farm animals is a desirable and profitable practice. It is evident therefore that some domestically produced oil seed crop will be required to supply the increased protein demand that has been stimulated during the war. Our farmers have become educated to the profitable practice of feeding a balanced ration.

Some criticism has been directed at soybean processors, feed mixers and dealers by farmers, due to the fact that soybean oil meal has not been available in sufficient quantities to meet this demand. These farmers object that mixed feeds are offered in place of straight soybean oil meal and they want soybean oil meal.

It is true that the inclusion of other ingredients makes soybean oil meal a better feed. So is it true that macaroni and cheese is a better food than either macaroni or cheese. BUT IF WE WANT CHEESE WE WANT CHEESE and not the combination.

The producer of soybeans is not pleased when he sells his soybean crop to the local elevator and is unable to obtain soybean oil meal but is forced to buy mixed feeds. Neither is the local elevator man who ships carloads of soybeans to local processing plants pleased when he is unable to obtain soybean oil meal made from the beans he shipped. We have seen this fall a comparatively large quantity of beans shipped out of Iowa because the dealer could get a few more cents per bushel from some out of state source. He did not feel obligated to local processors because of his difficulty in obtaining soybean oil meal in the past.

While free trade between the various areas of our country is a fundamental

(Continued on page 26)

Insects in Stored Soybeans

By M. D. FARRAR

Research Entomologist
Illinois Natural History Survey

A LARGE crop of soybeans was harvested in Illinois in the fall of 1942, a portion of which was stored by the Commodity Credit Corporation in steel bins recently emptied of shelled corn. About 50 of these bins located in Champaign, Iroquois, McDonough, McLean, LaSalle, and Whiteside counties were selected for a study of storage problems. Although the bins under observation ranged in size from 760 to 2,740 bushel capacity, data given are mostly from 2,000 bushel bins. Soybeans harvested in the fall of 1942 were considered about average in quality. Some frost-damaged beans were harvested and stored in McDonough and Whiteside counties. Official grades ranged between sample and No. 2 yellow soybeans. Bins that classified lower than No. 3 were so classified because of an excessive amount of split or damaged beans.

All of the soybeans used in these studies were considered satisfactory for storage. When stored the average moisture content was below 12 percent. Foreign material, mostly weed seed, ranged between a trace and 1 percent. The greatest variable factor within the bins was the amount of split beans, which ranged from 6.0 percent to 18.9 percent.

Within 2 months after the bins were filled, samples were obtained for classification and study. Procedures for periodic samples were established at the first sampling. Information on changes in temperature, moisture, chemical analysis, and insect populations were obtained over the period of storage.

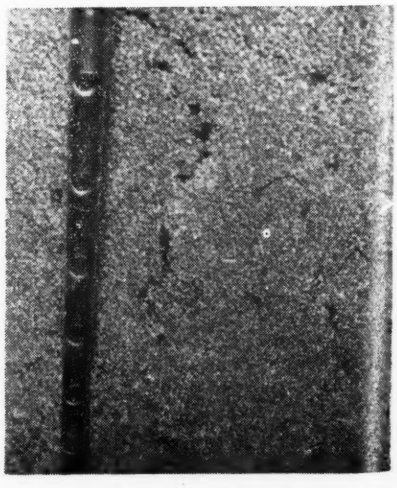
When first sampled 2 months after the bins were filled, the grain had already begun a redistribution of moisture into the upper layers. This is shown in Table 1, to a depth of 25 inches below the grain surface. From this time on, the grain on the upper surface area always contained moisture in excess of that in the lower portions of the bins. In the spring months the grain that contained excessive moisture molded. These moldy areas remained throughout the storage period. During the summer months they tended to dry out. An example of this drying is shown in Fig. 1, where large cracks can be seen formed in the solid molded grain surface. Under the surface layer, however, could be found moist grain that remained attractive to insects throughout the year.

In Table I and Fig. 2 are shown temperature and moisture changes over the period of study. It can be seen that the grain in the upper layers was always above 15 percent in moisture and at times it approaches 24 percent moisture. This condition was favorable to the breeding of insects during most months of the year.

The most common insects in soybeans were those usually associated with moldy grain. Their abundance depended on the extent of moldy grain in the individual bins.

A study of the data indicates that insects were not to a great extent responsible for the deterioration of soybeans; however, they probably did contribute to additional spoilage. Insects that bred within the areas of high moisture pro-

FIGURE 1. Cracks formed in the solid molded surface on a bin of soybeans. These cracks resulted from the drying of the hard crust during the summer months. (Photo in October.)



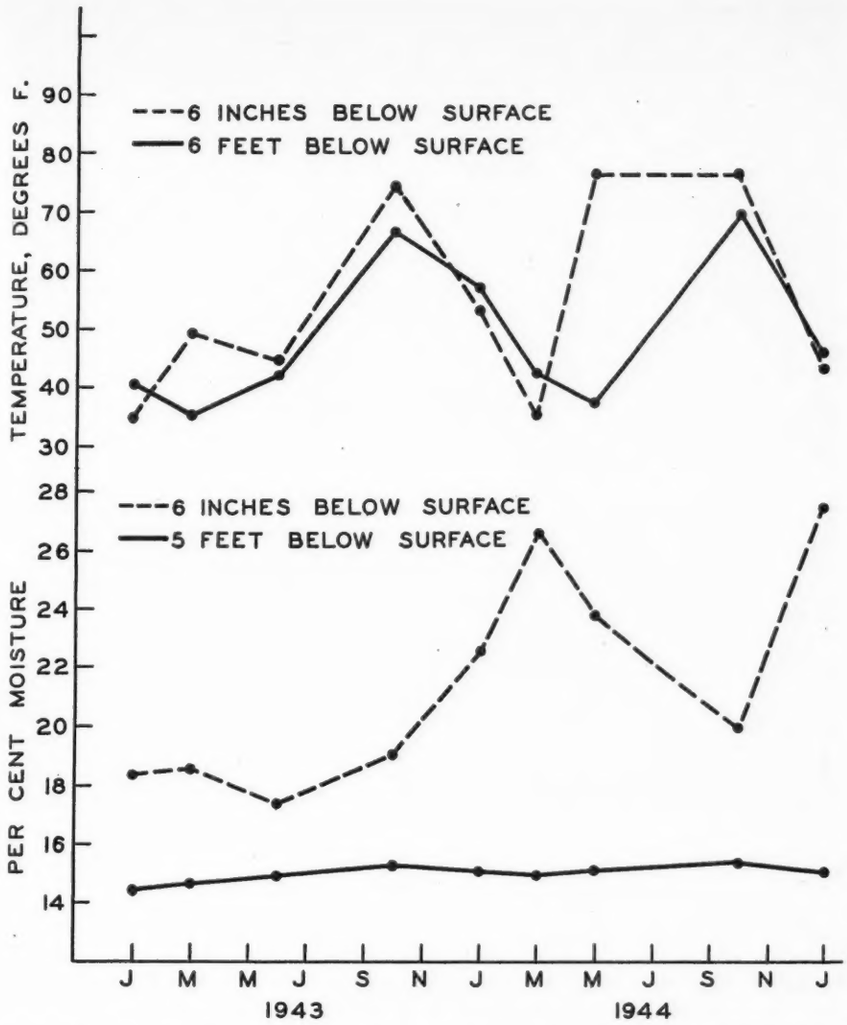


FIGURE 2. The graph shows some of the changes in temperature and moisture that occurred in soybeans over 24 months of storage. The data are taken from the centers of steel bins containing 2,000 bushels of soybeans.

duced additional moisture that was quickly absorbed by the grain.

Insects found in stored soybeans were essentially the same as those found in stored corn, with the exception of the two weevils, the granary weevil *Sitophilus granarius* and the rice weevil, *Sitophilus oryzae*. Neither of these was taken in any of the samples obtained over the 2-year storage period.

Of the insects attacking soybeans the first to appear was the Indian meal moth, *Plodia interpunctella*. The larvae of this species could be found in most bins at all times. In some bins their webs formed a sheet of silk over the entire surface of the bin. Their feeding, however, was largely confined to the upper layers of grain where they fed on split beans. Bins containing high percentages of splits had more Indian meal moths than did bins containing lesser amounts of splits.

Within a few weeks after storage, soybeans began to form a layer of high moisture beans over the bin surface. To this layer of beans were attracted the group of insects classified in the grain trade as "bran bugs." The most common of these was the flat grain beetle, *Laemophloeus minutus*. If molding occurred, the foreign grain beetle, *Ahasverus advenus*, became abundant in the areas of moldy grain.

During the first year of storage many other insects appeared in some or all of the bins. They were never abundant enough to threaten damage in themselves but as a group did contribute to additional spoilage. Among these were the long-horned flour beetle, *Cyneaus angustus*, the cadelle beetle, *Tenebroides mauritanicus*, the sawtoothed grain beetle, *Oryzaephilus surinamensis*, the rust-red flour beetle, *Tribolium castaneum*, and the hairy fungus beetle, *Typhaea stercorea*. A tiny black beetle known as *Murmidius avalis* became abundant in many bins but was always associated with moldy grain. Also psocids or booklice and grain mites were common in many bins.

INSECT SCAVENGERS

In the second year of storage appeared the dermestid beetles that were probably scavengers on dead insects. The most common of these was *Trogoderna versicolor*, along with smaller numbers of the black carpet beetle, *attagenus piceus*.

It may be concluded from a study of some 45 bins that under Illinois conditions insects were not a serious handicap in the storage of soybeans for 2 or more years. The application of this statement must be confined to bins filled with soybeans averaging less than 12 percent moisture. Data taken from other experiments that included bins of soybeans containing above 12 percent moisture indicate that insects may become a factor in attempting to store soybeans with a moisture content above 12 percent.

As far as insects are concerned, the following brackets of conditions are suggested. No damage will occur from insects in soybeans containing less than 8 percent moisture. Those with 8 percent to 10 percent moisture are relatively safe. In bins with soybeans of 10 percent to 12 percent moisture content, insects will breed in those parts of the grain where the moisture exceeds 12 percent. Soybeans with 12 percent to 14 percent moisture will be attacked by a variety of insects, some of which may cause additional spoilage. Bins containing soybeans with a moisture content in excess of 14 percent are not safe for storage beyond the first winter. Such bins will be heavily attacked by insects as soon as the insects become active in the spring.

In experiments reported the soybeans were not disturbed during the period of storage. Good grain handling practices such as recleaning, turning, scooping of the grain surface, etc. may be helpful in reducing the insect hazard, particularly in grain stored at the higher moisture content. In addition good sanitation practices will always be helpful in reducing damage by insects.

TABLE I. — The changes of average temperature and moisture found in 27 2,000 bushel steel bins filled with yellow soybeans in November, 1942.

Date of sample	Temperature				% moisture at depth in inches					
	Floor	3 ft.	6 ft.	9 ft.	3	8	14	25	36	46
Jan. 1943	42.6	41.0	41.5	35.4	16.5	15.1	13.6	11.7	11.4	11.2
Mar. 1943	39.4	35.6	36.3	49.7	14.4	15.4	14.2	12.2	11.6	11.4
June 1943	46.0	42.6	55.8	44.4	12.4	14.2	14.0	12.8	11.9	11.6
Oct. 1943	62.2	66.8	73.0	74.3	13.9	15.8	15.2	12.9	12.2	12.0
Dec. 1943	53.8	57.6	61.3	53.3	20.3	19.4	17.6	13.2	12.1	12.0
Feb. 1944	41.8	42.7	41.3	35.7	24.0	24.0	19.1	13.4	12.0	11.7
May 1944	42.4	38.1	44.0	77.2	17.0	20.5	19.0	13.6	12.1	11.9
Oct. 1944	63.3	69.8	76.8	76.8	15.9	16.9	16.1	13.0	12.2	12.1
Jan. 1945	44.7	45.7	48.7	43.8	24.0	24.0	20.6	13.6	11.8	11.7

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M. P. M.

FIVE-CENT SOY MEAL

A food consisting of 68 percent soy grits combined with dehydrated vegetables and seasoning and costing only 3½ cents per portion will save the lives of millions of starving people in coming months if the 15-year-old dream of a Los Angeles cafeteria owner to "put a floor under hunger" is realized.

This one dish Multi-Purpose Meal (MPM for short) was served regularly to delegates at the United Nations Conference. Shortly after, it was called to wide popular attention by Paul de Kruif in an article, "How We Can Help Feed Europe's Hungry," in September *Reader's Digest*.

The idea originated with Clifford E. Clinton, president of the well known Los Angeles Clifton's Cafeterias. He served as food consultant during the war to the War Department and UNRRA, saw the famine conditions spreading in Europe.

For years Clinton had been experimenting with emergency meals selling for as low as 5 cents to low income people in his cafeterias. Now he went to Dr. Henry Borsook, biochemist of the California Institute of Technology at Pasadena and suggested that he prepare a formula for an emergency meal that should be highly nutritious, providing sufficient vitamins and minerals for a meal, keep well over long periods without refrigeration, and yet be highly palatable and sell for a nickel or less!

It was a tough assignment. The result was MPM, which Dr. Borsook asserts is nutritionally superior to most meals consumed by Americans at a cost of a dollar or more. It is being served regularly in the Clifton cafeterias and over 200 southern California schools. We are told that the meal "has eye-appeal, bite-appeal and taste appeal. Moreover it is filling, psychologically satisfying and nutritionally adequate."

One of Clifton's Cafeterias in Los Angeles where the idea of a cheap, satisfying meal originated.

De Kruif estimates that our processing and dehydrating industries could turn out sufficient quantities of MPM monthly to furnish 70 million meals. Chief bottleneck to the extensive use of this product abroad seems to lie in the absence of any governmental agency with the authority, funds and determination to proceed.

The basic formula for the Multi-Purpose Meal, as submitted by Dr. Borsook, follows:

SOY GRITS, low fat, expeller process, precooked and dehydrated (50 percent protein)	68.0%
DEHYDRATED VEGETABLES, combinations as desired of onions, potatoes, green pepper, cabbage, tomatoes, celery, parsley, leeks, garlic and chili peppers	23.4%
SEASONINGS (each manufacturer has his own seasoning blend)	8.6%
	100.00

Vitamins and minerals are added to insure that 2¼ ounces of dry weight of the meal will contain one-third of the recommended daily allowance of the food and nutrition board of the National Research Council for a man doing sedentary work in calcium, iron, vitamins A, B_1, B_2, niacin and D.

To prepare add to 1 part by weight of the meal, 4 parts by weight of water and fat to 30 percent of the dry weight of the meal. Bring to a boil and simmer over a low flame for 30 minutes, stirring occasionally to prevent burning.

Two firms now manufacturing MPM are F. W. Bolz Corp., 3614 Council St., Los Angeles, and C. B. Gentry Co., 837 N. Spring St., Los Angeles.

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THE SUCCESSFUL FEEDING OF

SHEEP and GOATS

• This is the seventh of a series of eight special articles by eight well-known nutrition authorities on feeding livestock and poultry.

By Dr. P. R. RECORD
Member Soybean Research Council

TO PROPERLY feed the sheep in the United States during the current year there will be required an estimated 249,000 tons of high protein feeds and 865,000 tons of grains and mill feeds, according to the Feed Industry Council. On January 1, 1945, sheep on farms in this country were estimated to total 47,945,000.

For countless years sheep husbandry has been practiced. Down the centuries it has played an important role in agriculture.

Although grain and protein supplement feeding is essential for a successful sheep management program, sheep are primarily roughage consuming animals and are adapted to a system of pasture or range husbandry. The adaptations of sheep, however, because of certain anatomical characteristics, are limited to the consumption of short grass or succulent forage or soft, pliable not too coarse roughage.

Sheep have a relatively high nutritive requirement because they often produce 10 percent or more of their body weight in grease wool and from 8 to 16 percent of their body weight in the form of lamb during a gestation period of 147 days. In addition to this, during lactation they produce milk of high protein and mineral content. Since these products are all high in protein and minerals, these two nutrients are of primary importance in sheep feeding.

In a well planned program, pasture can be used as the basis of the feeding program over a large part of the year. Early spring pasture that supplies short, tender, highly nutritious grass of high protein content will supply practically all the nutrients required for satisfactory performance of the flock unless the pasture is overstocked. As the season advances and the grass becomes more mature, lower in nutritive value, and less palatable, it is necessary to use supplemental feeding unless other pasture of better quality can be provided.

In late summer and early fall, grass pastures that have come back with cool weather and rains can again be utilized for a large part of the feed — or the sheep may be turned on wheat pasture, a practice quite extensively followed in some areas.

The sheep feeding program can probably be divided into two main classes, feeding the ewe and lamb flock and feeding market lambs.

The ewe flock can be maintained largely on pasture or dry roughage. If pasture or roughage is to be used as the principal component of the ration, it must be of high quality — otherwise supplemental feeding with concentrates is required. Good quality alfalfa or other legume is the most satisfactory dry roughage for maintaining the ewe flock, because in amounts generally consumed it usually supplies sufficient protein and minerals to meet the requirement of the ewe for these essential nutrients and supplies sufficient energy. However, when carbonaceous roughage is used, it is necessary to supplement the roughage with protein and mineral by feeding a concentrate of high protein content such as soybean oil meal and a high calcium mineral.

With carbonaceous roughages from 0.2

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Nod-O-Gen inoculator for legumes is known as the "great profit maker" . . . because (1) growers find it pays big dividends in the field and (2) dealers find it builds an expanding repeat business. Book your 1946 Nod-O-Gen requirements now through your jobber or direct.

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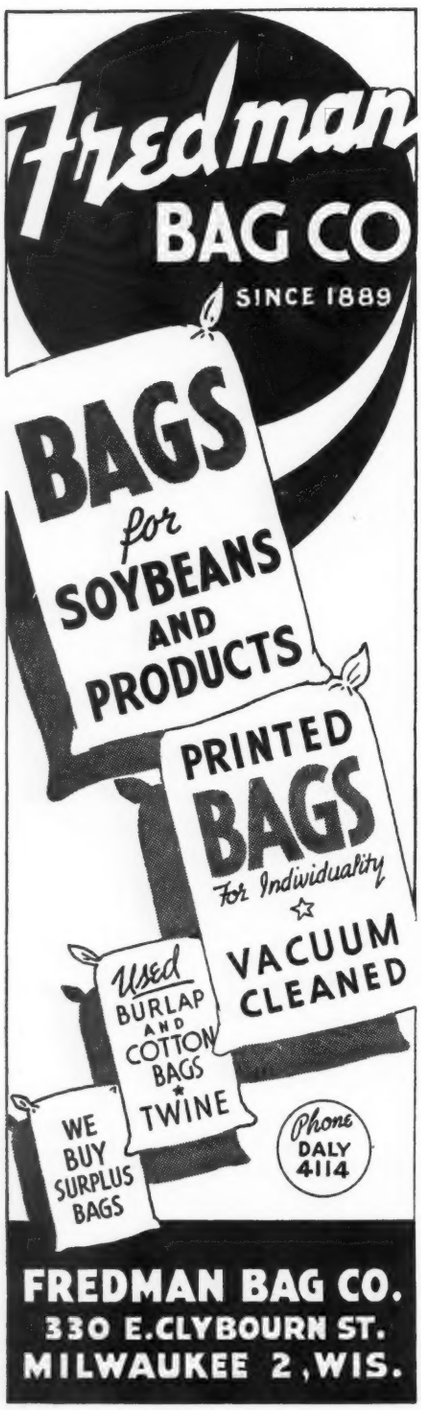
pound to ¼ pound daily of soybean oil meal per 100 pounds live weight will generally correct the average protein deficiency. A total intake of about 6 grams of calcium and 3 to 3.5 grams of phosphorus per day per ewe will be a satisfactory amount and in about the suggested ratio of 2 parts calcium to 1 of phosphorus.

Before breeding, it is sometimes advisable to flush ewes, especially if they have been maintained on rations which have caused the ewes to become thin.

During pregnancy, the ewe must be fed so as to maintain herself, produce wool and supply the needs of the developing lamb.



Legume hay may well be the basis of the ration of pregnant ewes. Corn silage is also an excellent roughage for ewes, but is deficient in protein and calcium and should be corrected by the use of about ¼ of a pound per head per day of a protein supplement such as 80 pounds of soybean oil meal, 10 pounds of finely ground limestone and 10 pounds of salt. This type of feeding program can be followed until about one month before lambing when the ewes should be given in addition to the above roughage feeding about ½ to ¾ pound of grain per head per day.

Tests have shown that the development and vigor of the lamb and the vigor and milk producing capacity of the ewe depend upon the kind and amount of feed the bred ewe receives. Bred ewes should be kept gaining in weight at a rate comparable to or slightly above the weight of the developing lamb and the increased weight of the fleece —a total increase during pregnancy of about 18 percent.

After lambing, the ewe produces a relatively large quantity of milk, high in protein and minerals. To do this, she must be fed for this production. A feeding schedule similar to that followed during the last month previous to lambing except that the grain allowance should be 1 to 1½ pounds per day makes a satisfactory lactation feeding program.

The wool produced is largely protein and the nutrition of the sheep exerts a direct influence on the quantity and quality produced.

On the ranges in the western part of the country sheep are maintained almost entirely on native forage. This forage is nutritious and can be grazed during winter unless it is covered with snow, since it cures on the stem. This forage is carbonaceous in nature and should be supplemented with a protein supplement, such as soybean oil meal or pellets. Tests and actual feeding results have shown soybean oil meal pellets to be highly satisfactory as a supplementary feed for wintering ewes on range.

Both native lambs and western lambs are used in the Cornbelt in the production of market lambs. With native lambs, the market feeding program often starts before the lambs are weaned by the use of creep feeding. In creep feeding, if the lambs are on pasture or have access to good legume hay the feeding usually consists of keeping grain in the creep where the lambs have access to it at all times.

After weaning, the feeding practices for lamb feeding are usually the same for both types of lambs. As in the case of ewes, probably the most economical method of feeding lambs is the use of good alfalfa hay or other high quality legume hay and grain. If, however, high quality legume hay is not available and such roughages as timothy hay, straw, corn stover or silage are the roughage, then it is necessary to use a protein supplement such as soybean oil meal and a high calcium mineral with the grain mixture.

The use of soybean oil meal as a supplement to an alfalfa hay, grain ration often results in increased rate of gain, the use of less grain per 100 pounds of gain and a higher finish.

Experimental results obtained in lamb feeding trials indicate that soybean oil meal is equal or superior to other protein supplements for rate and economy of gains when fed with an alfalfa hay, grain ration or a ration made up of carbonaceous roughage and grain. It has been found also that rations made up in the proportion of about 35 to 40 percent concentrates and 60 to 65 percent roughage produce the most efficient gains.

GOATS

Goat production in the United States is not as important as other livestock production, but sizeable numbers of angora goats are raised in certain sections for the production of mohair. Milk goat production is carried on in practically all parts of the country and in certain areas has reached a place of importance.

Angora goats are maintained largely on range or pasture and their feed requirements are very similar to those of sheep on range. If carbonaceous roughage makes up the ration during the winter, it should be supplemented with a protein concentrate, such as soybean oil meal or pellets and minerals in about the same proportions used for sheep.

Milk goats like dairy cattle are roughage consuming animals and the basis of the ration is pasture, silage or dry roughage. Goats are efficient users of succulent roughages and the ration should contain a small amount of some material as silage or root crops. The milk of the goat is similar in composition to that of the dairy cow and a feeding program should be followed that is based on the nutrient requirement for milk production and the quantity of milk produced.

When a high quality legume hay or nutritious pasture is supplied, a grain mixture lower in protein can be used than that needed with carbonaceous roughage. As in the case of the dairy cow, the protein content of the grain mixture should be governed by the quality and protein content of the roughages.

Very little experimental work has been conducted to determine the value of the various oil meals as protein supplements in rations for milk goats. However, if the information obtained from work with dairy cows can be applied to goats, soybean oil meal should make a highly satisfactory protein supplement to be used in feeding milk goats.

—s b d—

There was the smallest number of persons on farms in 1945 that has been recorded during the past 35 years.

AVAILABLE FOR LICENSE

Seized Enemy Patents

The following is a select list of patents relating to soybean utilization which are of foreign origin and have been seized by the alien property custodian.

In order to permit an examination of those patents which might be selected as having potential usefulness to the American soybean industry the list has been prepared and approved for publication in the *Soybean Digest.*

The patents are available for license. Applications should be made to James E. Markham, Alien Property Custodian, Field Bldg., Chicago 3, Ill.

GROUP I — LECITHIN

Serial No. APC 274,068, Kaufman. Filed May 16, 1939. Process for Refining and Improving Fats and Simultaneously Separating the Accompanying Substances Therefrom.

The inventor teaches a method of extracting lecithin and stearins from soybean oil by adsorption on aluminum oxide, silica gel, etc.

Patent No. 1,972,764, Engelmann. September 4, 1934. Process for the Production of Stable Water — Containing Emulsions of Vegetable Lecithin.

The invention consists of a process of preparing a stable, aqueous emulsion of lecithin from fresh soybean slime by adding a small amount of sodium hydroxide or sodium peroxide. It is maintained that an unfermentible emulsion of superior appearance and stability is obtained, if the water content is reduced to 30% by vacuum evaporation.

Patent No. 2,278,943, Oesterreich. April 7, 1942. Process for the Production of Rubber-like Binding Agent for Fiber substances.

The patent discloses a method of preparing a rubber-like binding agent by dispersing vegetable lecithin in boiling water and adding a solution of phenol-aldehyde resol in dilute caustic. Natural or synthetic latex is added. The mixture can be precipitated on fiber substances in an insoluble form on acidification.

GROUP II — FOODS

Serial No. APC 390,847, Ruther. Filed April 28, 1941. Red Pepper Surrogate.

The inventor teaches the production of an improved substitute for red pepper by combining mustard seed flour, soy flour, roasted chicory flour, fat-soluble red dye and synthetic or natural red pepper oil.

Patent No. 1,688,857, Domoto. October 23, 1928. Lining Composition for Metallic Containers.

Soy paste so corrosive that its storage has been limited to glass or wood containers, may be packed in metal cans lined with rubber, benzene and aluminum soap mixture.

Patent No. 1,799,256, Satow. April 7, 1931. Apparatus for Treating Soybeans.

The inventor describes apparatus for solvent extraction of soybean oils and volatiles without denaturalizing or decomposing the proteid content of the beans. The apparatus consists of a rotary drum with provision for controlling temperature and flow of solvent, and for drying the exhausted beans after extraction with hot air.

Patent No. 1,862,945, Schlotterhose. June 14, 1932. Process of Extraction from Substances Containing Oil, Fat, etc.

The patent teaches the introduction of the ground source of oil or fat at one end of a battery of 4 continuous cylindrical extractors and the solvent, i.e., ethylene chloride or ethylene trichloride at the other end. After leaving the extractors the residue is treated with live steam to eliminate the solvent.

Patent No. 1,892,366, Sato and Ito. December 27, 1932. Method of Extracting Fatty Oil.

The inventors disclose a solvent extraction process for oil extraction from dry soybeans using ethyl alcohol and heating the mixture under pressure. The extract is cooled, resulting in separation of the oil from the alcohol.

Patent No. 1,944,962, Behrend. January 30, 1934. Manufacture of Edible Fats.

The invention consists of a method for improving stability and fineness in margarine emulsions by churning the hardened soybean oil with malt extract-lecithin mixture.

Patent No. 2,093,348, Carpzow. September 14, 1937. Process for the Refining of Mineral, Vegetable or Animal Oils, Paraffins, Waxes, Resins and the Like.

The inventor proposes to refine oils, waxes and resins by weakly acidifying the material,

Swift's Soybean Oil Meal

And Swift's Soybean Oil Meal is certainly clicking with feed manufacturers, feed mixers and feed dealers. That's because it's (1) a high-quality protein base for livestock and poultry feeds. (2) It adds appetite appeal. (3) It gives the right balance to your formulas. (4) It is always uniform in quality and gives dependable results.

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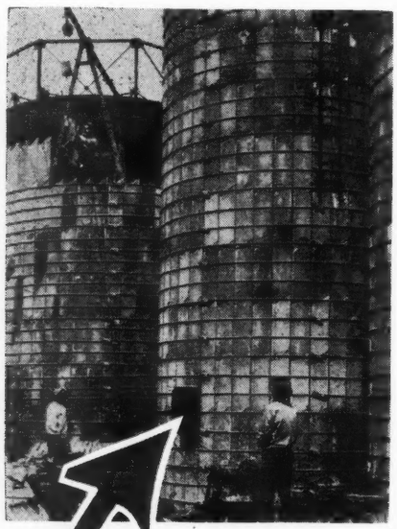
shaking with chemically active, dry, finely powdered colloids from fresh or salt water mud and separating the refined product from the refining agent.

Patent No. 2,147,177, Seto and Sato. February 14, 1939. Method of Hydrogenation of Fatty Acid Glycerides.

The patent discloses a method of hydrogenating fatty acid glycerides in the presence of nickel catalysts by subjecting the mixture to successive high tension alternating and direct current discharges.

Patent No. 2,158,427, Reichert. May 16, 1939. Process for Extracting Oil or Fat Containing Substances and the Like.

The patent discloses a means for grinding, pressing and counter-currently extracting by a solvent in a special apparatus fats or oils from peanuts, etc.



GROUP III — FIBERS AND PLASTICS

Patent No. 1,811,972, Schmidt. June 30, 1931. Process for the Production of Artificial Horn.

The patent teaches a method for the production of artificial horn from soybean protein and cellulose derivatives using special solvents. The compositions have greater plasticity than those made from straight proteins.

Patent No. 2,272,563, Iwamae. February 10, 1942. Process for Manufacturing Vegetable Proteins.

The inventor discloses an economical method of extracting soybean proteins with sulfurous acid. The liquid extract is atomized under reduced pressure to eliminate sulfur dioxide which raises the pH value to the isoelectric point to precipitate the undenatured protein.

GROUP IV — PAINTS AND COLORS

Patent No. 1,896,467, Scheiber. February 7, 1933. Process for the Treatment of Fatty Oils.

To improve the film-forming property of soybean oil in the varnish field the inventor proposes to shift the double bonds to conjugated double bonds by treatment with a catalyst and a heat treatment to 300°C. The fatty oil product is said to be fast-drying and water resistant to a degree equal to China wood oil.

Patent No. 2,263,195, Shikata and Inoue, November 18, 1941. Manufacture of Higher Alcohols by Reduction with Sodium Amalgam.

The inventors describe a simple process for manufacturing higher alcohols from soybean oil acid derivatives by continuous treatment of them in an organic solvent with sodium amalgam.

GROUP V — SOAPS AND EMULSIFIERS

Serial No. APC 255,603, Rastelli. Filed February 10, 1939. Process for the Dissociation of Fats.

The inventor discloses a simple, economical means of continuously hydrolyzing fats by mixing with water, fat and a catalyst in a vat, pumping the emulsified mixture through a copper tube heated in an oil bath to 150-200 degrees C. and discharging the product into a vessel from which layers of fatty acid and of glycerin-water solution can be separated. (See also Ser. No. APC 315,716 below.) Research and development are indicated to compare this process with other pressure methods for the hydrolysis of fats.

Serial No. APC 315,716, Curletti and Martini. Filed January 26, 1940. Process for the Dissociation of Fats.

As a structural modification of Serial No. APC 255,603, above, the inventors propose to substitute several narrow copper tubes connected in parallel by two proportionately wider collecting tubes for the single tube suggested by Rastelli.

Patent No. 2,079,973, Strauch. May 11, 1937. Water Soluble Sulphonation Products of Phosphatides, and Process for Preparing Same.

The invention disclosed is the making soluble of phosphatides by sulphonation below 10°C. in the presence or absence of diluents, dehydrating agents, fats, oils or fatty acids. As agents for washing, wetting, emulsifying, cleaning, softening, equalizing, loading, penetrating, reviving and finishing in the textile, leather and cosmetic industries certain sulphonated products are said to be advantageous because of high solubility in water, high permeation and penetrativeness, stability to acids and alkalies and protective col-

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Soybeans have arrived as a major crop — which means adequate storage facilities are needed in the soybean business. Neff & Fry super-concrete stave bins provide quick, economical storage. Hundreds erected the past five years and scores more going up. Any capacity required. Fast erection by trained crews. Every installation guaranteed. 1945 catalog explains super-concrete stave construction. Write
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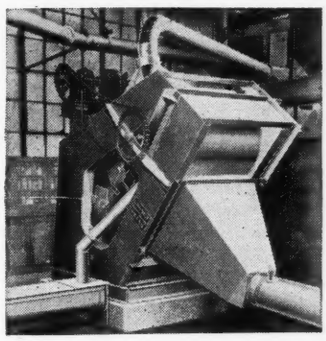

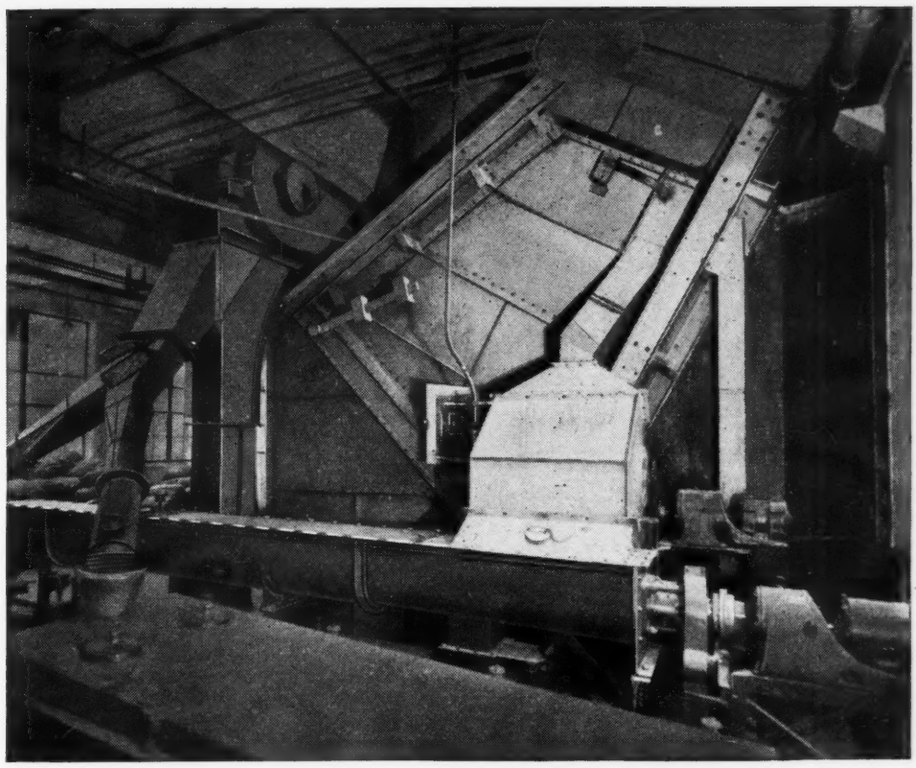

Above: The new Link-Belt Multi-Louvre Dryer-Cooler, first announced to the trade about a year ago. *Right:* Same equipment in use at A. E. Staley Mfg. Co., Decatur, Ill. In foreground is discharge spout through magnetic separator into an L-B screw conveyor. Also shown is an L-B Bulk-Flo elevator with two-way chute to a set of screens. Other types of Link-Belt conveyors are also used throughout this new plant.

How Staley Uses L-B Multi-Louvre to Dry and Cool Soybean Flakes

Advantages of Multi-Louvre Dryer-Cooler at A. E. Staley Mfg. Co.

Compactness. One Multi-Louvre dryer-cooler serves in place of a number of other units otherwise required. Great saving of floor space.

Cleanliness. Unit is fully enclosed. Any dust is collected in cyclone dust collectors.

Economy, both in first cost of installation and in operation. Low horse power requirements. Also saves floor space for other use.

Freedom from Condensation and subsequent dripping on floors.

Prevention of Balling of material through condensation.

Elimination of Any Pockets and corners in which the product might lodge and become rancid.

● Seeking an improved method of cooling large flows of spent soybean flakes without having a multiplicity of equipment, the engineers who laid out the A. E. Staley Mfg. Company's large new solvent extraction plant at Decatur, Ill., came to Link-Belt.

Taking into consideration the large cooling capacity required and certain other conditions, a Link-Belt Multi-Louvre Dryer-Cooler was installed, with highly satisfactory results. (For smaller capacity, a Link-Belt Roto-Louvre unit might have been recommended.)

The Multi-Louvre Dryer-Cooler applies the well-known Link-Belt Roto-Louvre principle of operation, and is especially suited to the drying or cooling of materials that do not require long retention periods. It is extremely compact in both small and large capacities, requires but little power for its operation, and effects substantial economies in drying or cooling many materials.

The louvres of the Multi-Louvre unit move the material gently through an air stream to secure uniform results with minimum degradation of the product. When used as a dryer, this method permits relatively high air temperatures to be utilized without danger of overheating or case-hardening the product, clogging, etc.

Get the details on this and other Link-Belt dryers and coolers. Ask your nearest Link-Belt office to have a Materials Handling Engineer call on you.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

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Uninoculated soybeans may grow on good land by feeding on the land just as does corn. It may cost as much as $10 per acre to replace the nitrogen consumed by one crop of uninoculated soybeans. Take this nitrogen from the air — save up to $10 per acre with **KALO INOCULATION.**

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Neither prior crops or the presence of nodules, can guarantee proper inoculation and there is no assurance that effective strains of bacteria will survive from year to year. A **sure** way is to inoculate each crop with Kalo Inoculation — this is good insurance.

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Kalo inoculants contain superior strains of bacteria . . . carefully selected for their ability to fix nitrogen. Over 500 competitive tests have proven Kalo inoculants to be of top ranking quality. Yet, our price is low — FROZEN there by OPA! You can save and **profit** with Kalo Inoculation.

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3 Cultures in 1 Can
for all clovers, alfalfa
and soybeans

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QUINCY ILLINOIS

loid effect. Soy lecithin is recommended as suitable raw material.

Patent No. 2,097,121, Fromm. October 26, 1937. Process for Prevention and Removal of Foam in the Manufacture of Paper.

The inventor sets out that foaming of aqueous solutions can be controlled by adding small quantities of soy lecithin. This is said to be preferable to the use of inflammable and toxic oils in organic solvents used as foam preventers. The need for further research or experiment beyond verifying the claims of the patent does not suggest itself.

Patent No. 2,112,802, Behre. March 29, 1938. Rubber Compounds and Process of Making Same.

The invention consists of a process for swelling rubber by adding phosphatides to a liquid swelling agent for rubber latex. Benefits are a saving in the quantity of naphtha needed and less toxicity and flammability of the adhesive mass produced.

Patent No. 2,121,367, Schiller. June 21, 1938. Process of Catalytically Hydrogenating High-Molecular Nonaromatic Carboxylic Acids.

Long chain alcohols may be derived from fatty oils by catalytically hydrogenating high-molecular nonaromatic carboxylic acids under pressure in the presence of catalysts and basic oxides of di- or trivalent metals in amounts at least molecularly equivalent to the carboxylic acids present. The products are useful as intermediates in the textile art. Research indicated is a more complete comparison of the catalysts of this invention with those now in use for the reduction of acids to alcohols.

GROUP VI — MISCELLANEOUS

Patent No. 1,857,914, Keyssner and Mengdehl. May 10, 1932. Mixed Fertilizer.

The inventors state that if soybean meal, freed from oil is heated and then mixed with urea the mixture does not split off ammonia even in the moist state.

Patent No. 1,990,343, Naruse. February 5, 1935. Process for Preparing Food for Silk Worms.

To conserve mulberry leaves and reduce production costs the inventor recommends preparation of silkworm food by adding a small quantity of mulberry leaf juice to soybean pulp.

Patent No. 2,117,113, Engler. May 10, 1938. Continuous Oil Extracting Apparatus.

The invention concerns oil extraction apparatus of the pater noster type in which the extraction agent trickles over the material contained in sieve boxes arranged one above the other. A vertical series of containers with perforated connecting tubes for conducting the solvent from pocket-like receiving chambers attached to the ends of the containers insures even distribution of the solvent.

Patent No. 2,120,410, Kawata. June 14, 1938. Yeast Nutriment Containing Liver Oil and Method of Manufacturing the Same.

The invention consists of a method of preparing a nutritious and palatable concentrated food by impregnating oil-free soybean meal with liver oil and introducing an aqueous solution of sugar and yeast. Autolysis of the yeast at 50-60°C. converts the mass to semifluid form. It is then combined with powdered yeast and dried for use in bulk or tablet form.

Market Street

We invite the readers of THE SOYBEAN DIGEST to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

Rate: 5c per word per issue.
Minimum insertion $1.00.

FOR SALE — Carload lots or less Indiana Certified Tama Seed Oats; Lincoln and Earlyana Soybeans. Prices on request. Glenn L. Kinsell, Remington, Indiana.

FOR SALE — Certified Lincoln soybean seed. Foundation stock. Varietal mixture .04%. Order early. Edward F. Lehman, Remington, Ind.

WANTED — Two to four late model Duo or Super Duo Anderson Expellers. Must be in good condition. Address reply to CO, Soybean Digest, Hudson, Iowa.

WANTED — To hear from owner of farm or unimproved land for sale. Wm. Holly, Baldwin, Wis.

CERTIFIED LINCOLN soybean seed, also Earlyana for sale. Special price in truck or carload lots. Bert L. Benskin, Laurel, Iowa.

FOR SALE — Certified Lincoln soybean seed $3.00 bu. sacked and certified good quality. Also certified Tama oats $1.25 in bags. Henry Osterbur, Jr., Rt. 1, Ogden, Ill.

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A. S. A. Meeting to St. Louis in 1946

The 1946 convention of the American Soybean Association will be held in St. Louis next August 29, 30 and 31, the board of directors decided at its annual winter meeting in Chicago December 5.

Because of wartime travel restrictions A. S. A. did not hold a convention this year. Prospects for a successful convention in 1946 are very bright.

The board opposed in no uncertain terms provisions of the bill HR 4676 now before the Ways and Means Committee of the lower house of Congress which would remove a 3-cent processing tax now being levied on copra imported from the Philippines and processed in this country.

The following resolution concerning this provision was adopted: "Be it hereby resolved by the board of directors of the American Soybean Association, in annual meeting assembled, that the Association be placed on record as unanimously opposing any and all reductions in processing and/or import taxes on fats, oils and oil-bearing materials of any type, such as is contemplated in certain sections of HR 4676 now being considered by the ways and means committee of the House of Representatives of the United States."

The National Peanut Council, the Southern Commissioners of Agriculture and the American Farm Bureau Federation also have taken stands against this provision of HR 4676.

Articles of incorporation and bylaws for the Association were adopted, which will incorporate A. S. A. as a corporation under corporate law not for pecuniary profit, with principal place of business at Hudson, Iowa. They will be published in the January issue of the *Soybean Digest*. Members of the committee in charge of constitution and bylaws revision were W. E. Beeson, Indiana; Jacob Hartz, Arkansas, and G. G. McIlroy, Ohio.

Nine of the 11 board members were present at the meeting.

—s b d—

SEES NO THREAT FROM ABROAD

"There do not appear to be any straws in the wind which would lead us to become alarmed over the possibilities of destructive competition arising from rival domestic oil seed crops or from other known competitive products," said Whitney H. Eastman, president of the vegetable oil and protein division, General Mills, Inc., Minneapolis, in a recent broadcast over University of Illinois Station WILL.

"As for foreign competition, the soybean industry is now so firmly entrenched in our agricultural and industrial economy and so thoroughly mechanized in all segments of the industry that it should be fairly immune from destructive competition from foreign vegetable oils and proteins for some years to come.

"It will take other nations years to catch up to us. This is especially true of the Orient. Our continuing advances in research and technology should hold this lead over our foreign competitors even though our import tariff rates are slashed in half."

—s b d—

FORMER MISSOURI DIRECTOR IS DEAD

Roy H. Monier, former director of the American Soybean Association from Missouri, was found dead in the bedroom of his home at Carrollton, Mo., November 5.

Monier had been in poor health since suffering a stroke 2 years ago while presiding over a statewide soybean meeting at St. Joseph, Mo.

He was active in Missouri Republican politics, had served as chairman of the state tax commission and as president of the board of managers of the state eleemosynary board.

Mr. Monier had been active in Association work and a regular attendant at conventions until his illness.

—s b d—

BRIERLEY HEADS SOY FLOUR GROUP

Above is R. G. Brierley, recently elected to succeed E. J. Dies as president of the Soy Flour Association.

Brierley is manager of the soy products division of Archer-Daniels-Midland Co. and the Commander-Larabee Milling Co. of Minneapolis. He has been a member of the soy flour advisory committee of the War Food Administration in Washington and has played an active part in the government's program for utilizing soy products for foreign relief feeding.

The Soy Flour Association represents all the major processors of soy flour in the country.

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GRITS and FLAKES... FROM THE WORLD OF SOY

Doughboy Mills, Inc., New Richmond, Wis., have purchased the Fairfield Soya Products Co., Fairfield, Iowa, formerly owned by the Sinaiko interests, according to announcement of E. J. Cashman, president of the Wisconsin firm. Albert E. Beckman will continue as manager.

* * * *

Soy flour will be one of a selected list of commodities on which zoning regulations in Great Britain will be relaxed March 2, according to Scottish Amalgamated Trade News Agencies. Due to the shortage of gasoline and of transportation facilities the wartime zoning regulations were adopted to prevent the criss-cross shipping of food supplies.

* * * *

Joseph Sinaiko, Cedar Rapids, has bought the new Washington, Iowa, soybean processing plant of Honeymead Products Co., and will continue with expansion of the plant, it is announced. S. H. Burchfield, plant manager, will remain. Sinaiko is a pioneer Iowa processor.

* * * *

H. L. Raclin & Sons, Chicago, announce the return of Capt. Robert L. Raclin of the U. S. Marine Corps to a partnership in the firm, which he left on his enlistment in 1941. Captain Raclin traveled throughout Europe in past years in the interest of the soybean and vegetable oil industry. Raclin & Sons specialize in oil-bearing nuts and seeds, packing house products and foodstuffs, and have been particularly active in soybean merchandising.

* * * *

Comm. A. Ernest MacGee, officer in charge of the chemistry section of the research and standards branch of the U. S. Navy Bureau of Ships during the war, has returned to the Skelly Oil Co. as head of the solvents department. Under Dr. MacGee's supervision, the chemistry section had experience with rust preventative compounds, paints, rubber, insecticides, adhesives, detergents, plastics, cellulosic materials, and other non-metallic products used in the ship building and maintenance program.

* * * *

Soybean acreage increases are planned by 22 percent of growers. This is indicated by a survey taken by the Association of National Advertisers, which included 2,907 farmer interviews.

* * * *

Following 2½ years service with the naval air forces, Miller W. Conn has resumed his duties as manager of the Perco division, chemical products department of Phillips Petroleum Co., Bartlesville, Okla. A. E. Buell, who served as acting manager during Conn's absence, will again devote all his attention to managing the special products division.

* * * *

A survey of soybean production in the Kansas City trade territory will be one of a series of industrial surveys to be taken by the Kansas City plan commission, L. P. Cookingham, city manager, announces. Among advantages possessed by the K. C. trade territory are listed the fact that industries already established make wide use of vegetable oils and protein products, and that growing areas are relatively close and a large volume of soybeans are shipped into Kansas City.

* * * *

Clarence Rosenquist, on leave of absence from the sales department of Union Special Machine Co., Chicago, has recently received promotion to the rank of Lieutenant Commander while on active duty with the U. S. Navy in the European theater. In notifying the Union Special Machine Co. of the promotion, Commander Rosenquist's immediate superior took occasion to extend personal commendation for the number of special missions executed successfully in connection with textile procuremnet.

* * * *

L. B. Falkenburg, until recently with the oil and protein division of the Northern Regional Research Laboratory at Peoria, Ill., is now chief research chemist for the Maytag Co., Newton, Iowa.

* * * *

House of Better Living, health food store in Los Angeles, which had been owned and operated by Mildred Lager for 14 years, has been sold to Victor and Marvin Lemon. Miss Lager, who is the author of *The Useful Soybean*, announces that she will continue to teach and write.

* * * *

E. L. Dutcher, assistant manager of Swift & Co. soybean mill at Des Moines, Iowa, has been made sales director of protein concentrates and by-product feeds for the firm with headquarters in St. Joseph, Mo. Loren E. Davis, recently discharged from the army air forces and formerly with Swift's, will succeed Dutcher in the Des Moines plant.

* * * *

Postwar building program of Dannen Mills, St. Joseph, Mo., includes a million-bushel grain storage elevator with about 30 storage tanks adjoining and a new feed mill of five or six stories.

"SOYBEAN" JOHNSON

"SOYBEAN" JOHNSON LEAVES PURINA CO.

E. F. (Soybean) Johnson, manager of the soybean and oil meal division of Ralston Purina Co., St. Louis, and one of the old-timers in the soybean business, resigned Nov. 9. He has been succeeded by Donald B. Walker, former manager of Ralston Purina soybean plants at Circleville, Ohio and Iowa Falls, Iowa, and for the past 2 years grain buyer for Purina Mills at St. Louis.

"Soybean" has announced no plans for the present beyond a long vacation, the first in 41 years.

Several other changes in the company have been announced by Donald Danforth, president. They include:

A. E. Cayce, manager of the grain division of the buying department, has been made assistant vice president and assistant director of purchasing. Succeeding Cayce as manager of the grain department is R. H. Dean, manager of Purina's Circleville, Ohio plant.

John P. Brown has been named assistant manager of the soybean department under Walker.

—sbd—

OIL CHEMISTS WILL STUDY SOY FLOUR

With a total of 34 papers and a registration of 516 members and guests the 19th annual fall meeting of the American Oil Chemists' Society in Chicago on November 7-9 became the largest gathering in the history of the Society. Visitors included chemists from England, Canada, Australia, and El Salvador.

Business transacted by the governing board on November 5, with President Robert

R. King of the Interstate Cotton Oil Refining Co., Sherman, Texas, as chairman, included:

Approval of an annual award of $1500 to a graduate student for research; inclusion of fiber and ash, lecithin, and soya flour in studies made by the technical committees; and authorization of a study to coordinate the technical committees with the sections in the forthcoming revised edition of the Official Methods of Analysis, which is to be brought out soon under the direction of V. C. Mehlenbacher of Swift and Co., Chicago, technical editor.

Sections in the new edition will be (a) vegetable oil source materials, (b) oil seed by-products, (c) commercial fats and oils, (d) soap and soap products, (e) sulfonated oils, and (f) glycerine.

The board selected Chicago as the 1946 meeting place for fall, following previous acceptance of New Orleans for the annual meeting in the spring.

—s b d—

"ROMANCE OF LINCOLN SOYBEAN" ON RADIO

"Romance of the Lincoln Soybean," a dramatic story of soybean research at the University of Illinois, was presented on the Illinois farm hour program over Station WILL November 26.

The special feature was a tribute to the years of soybean research by Clyde M. Woodworth, professor of plant genetics, who this year celebrates his 25th year in the agronomy department of the University, and Dr. L. F. Williams, U. S. Regional Soybean Laboratory.

Produced by George Sharp of WILL, the cast for "Romance of the Lincoln Soybean" included Nelson Norman, chief announcer for the station, and University students Richard Creswell, Chicago; Lee Dupre, Oak Park; Robert Sang, Chicago; and Tom Thompson, Chicago.

The script was by Johanna Hanson, of the extension service.

—s b d—

BUYS FIRST BOND

To Al Katz of Indianapolis, Ind., went the honor of buying the first Victory Bond in the present nationwide drive. Here the secretary-treasurer of the Max Katz Bag Co. is shown buying the bond of Mrs. Edith Brusiloff, Washington, D. C., on the south portico of the U. S. Treasury Department.

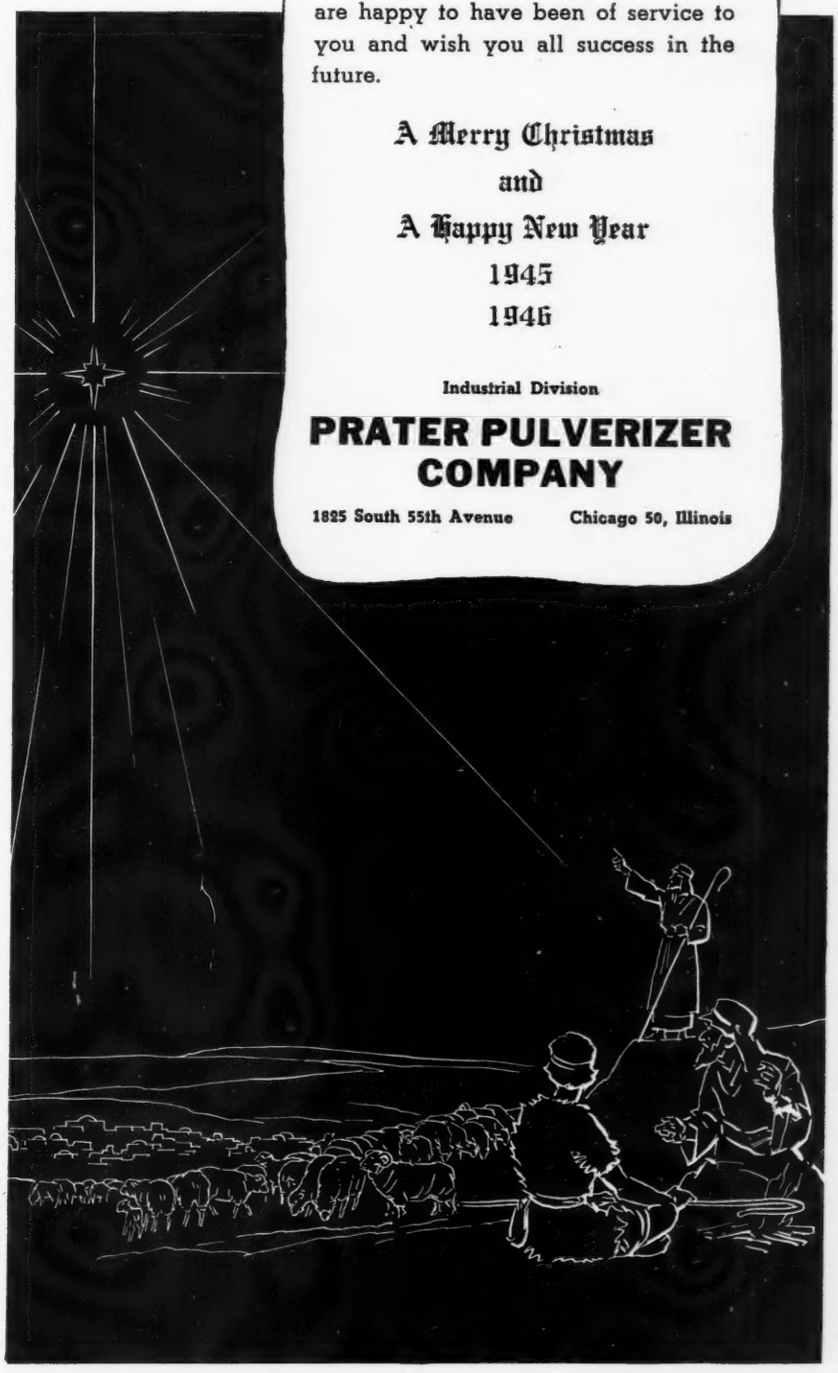
Four Years Ago

on December 7, 1941, America turned from peaceful contemplation of the holidays to the grim task of war.

Today as we return to the paths of peace may we say to the Soybean Industry of America that we are proud of the way you played your part. No industry rendered greater or more loyal service in your country's cause. We are happy to have been of service to you and wish you all success in the future.

A Merry Christmas
and
A Happy New Year
1945
1946

Industrial Division
PRATER PULVERIZER COMPANY
1825 South 55th Avenue Chicago 50, Illinois



ROACH

(Continued from page 12)

business axiom it would seem that Cornbelt processors, elevator men, livestock and soybean producers should get together to insure the livestock producers that adequate supplies of soybean oil meal will be available to feed the livestock of our farms.

It is by bringing to the farmer the realization that SOYBEAN OIL MEAL WILL BE AVAILABLE ONLY IF SOYBEANS ARE GROWN ON CORNBELT FARMS, that we can keep the farmer interested in growing soybeans. This will require cooperative effort to convince the soybean farmer that his product is essential to the welfare of our livestock industry.

It might be well to look at competing uses for soybean oil meal other than livestock feed. Research is constantly developing new uses for this important protein.

We have heard much in the past about the use of soybean oil meal in plastics, but already better and cheaper material has been found for that purpose than the use of soybean oil meal. That is a use that has been outmoded by research. The horn button and accessories of your new car will not be made from soybean plastics.

Edible high and low fat soybean flour is constantly finding its way into various human food products. The amount of soybean oil meal going to this trade is constantly expanding.

There now are on the shelves of merchants fabrics manufactured from the protein of milk. Intensive research is being carried on to utilize the protein of soybeans for similar synthetic fibers. It is entirely possible that the wool of the future will come from soybean fields rather than from the backs of bleating sheep.

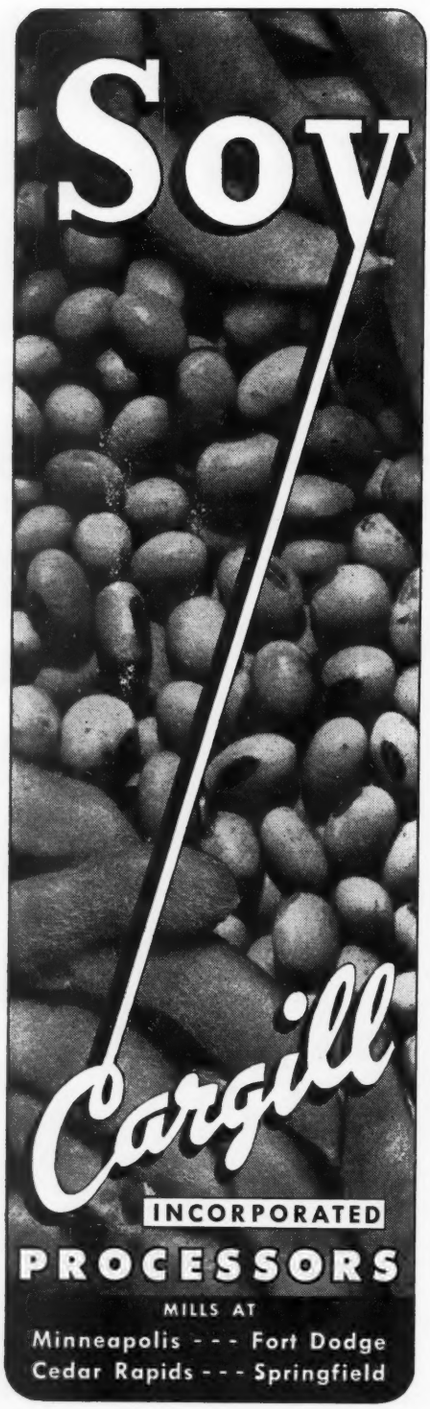
The adhesive industry has used soybean protein in greater and greater quantities for the production of glues until today it is standard practice to glue barns together rather than use nails.

Everyone today knows what plywood is. Fifteen years ago it was a curiosity. New types of building material will create new demands for adhesives. The protein of soybeans will get its share of this new business.

The successful control of oil fires in our navy, which caused us so much loss at the beginning of the war, was brought about by the use of a product manufactured from soybeans. This material is now available to industry. Part of the soybean crop will in the future be used to extinguish the fires of the farm homestead.

The laboratories and factories of industry are now busily engaged in developing new and better articles for the consumer. Abundant sources of soybean oil and meal are necessary in many of these processes. The American farmer can supply these raw materials through his soybean crop.

I feel confident that the Iowa farmer has discovered the possibilities inherent in the soybean crop, and that we will see our soybean acreage adjusted as the demand for the products manufactured from soybeans is expanded.



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EASY TO USE. Just spread a thin coating with a paddle or knife, press pieces firmly together and allow to dry. They will not peel or tear.

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— Incorporated —

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WASHINGTON Digest

By PORTER M. HEDGE
Washington Correspondent for The Soybean Digest

USDA Sets Support

Secretary of Agriculture Anderson has decided on a 1946 price support of $1.80 a bushel, 5 cents lower than the figure discussed at the turn of the month, according to word reaching the *Digest* at press time.

Anderson figures this is as high as the Administration can go on price support on next year's soybeans. The estimate is that $1.80 will attract from 8 to 8.5 million acres next year compared with 10.5 million acres this year.

Anderson plans to confer with processors before deciding on a price ceiling increase for soybean oil or oil meal.

A price floor of $1.80 leaves from 7 to 8 cents a bushel to be made up either in subsidy or by raising price ceilings of one or more soybean products. Under existing price ceilings on soybean oil and meal, processors are able to pay producers from $1.70 to $1.75 a bushel without subsidy.

Secretary of Agriculture Anderson is opposed to continuation of the soybean subsidy, but the method by which he will make up the difference between proposed price support and what processors can pay under present ceilings isn't yet entirely clear.

The Fats and Oils branch of Production and Marketing Administration has recommended to Anderson that the difference be made up by increasing the price of protein meal by $5 a ton. The proposed increase would, of course, apply to other oilseed meals as well as to soybeans.

Anderson hasn't put his blessing on this plan as this was written, since it would involve a question of higher feed costs.

The officially-proposed 1946 soybean acreage goal is 9,500,000 acres, a 10 percent cut from this year's harvested acreage. At an average yield of 18.6 bushels per acre, this would produce a crop of 176,700,000 bushels.

The goal was changed at least four times during the month before it was announced.

The most common estimate in Washington is that a price of $1.85 a bushel will pull from 8 to 8½ million acres of soybeans. THIS IS IN LINE WITH ESTIMATES MADE AT THE RECENT CHICAGO MEETING OF TRADE AND FARM GROUP REPRESENTATIVES.

The suggested 9,500,000 acre soybean goal, however, may or may not be the Department's final recommendation. This acreage is only a target for state officials to shoot at. Proposed goals for other oilseed crops: Flax, 4,200,000 acres; cotton, 20 million acres; peanuts, 3,250,000 acres, of which 2½ million would be picked and threshed.

Won't Limit Oil Meal

A plan to limit the use of protein ingredients in the manufacture of poultry feeds to 100 percent of use last year is being proposed in the Production and marketing Administration, but there was no indication early this month that it would get the approval of Secretary Anderson.

The plan suggests issuance of an order calling for more or less voluntary limitations by feed manufacturers for 60 to 90 days. It was outlined by Walter Berger, head of the feed division of PMA, at a recent meeting of the Western Grain and Feed Association in Des Moines, Iowa.

Feed officials are concerned over the squeeze on protein meals, but the proposal to limit its use comes at a time when the Administration is headed in the opposite direction — to shed all possible controls as quickly as it can.

Berger says there won't be enough protein meal this winter to meet the demand. The main reason is the big increase in poultry. Turkey production is up 28 percent over a year ago, chick production is up 24 percent.

The reconversion scramble for postwar business also is reported to be causing enough shifts in distribution to upset the normal distribution pattern which had been counted on during the winter period.

October meal production was 96 percent of last year, but November output is estimated at about 5 percent over a year ago.

Oil Meal Allocation

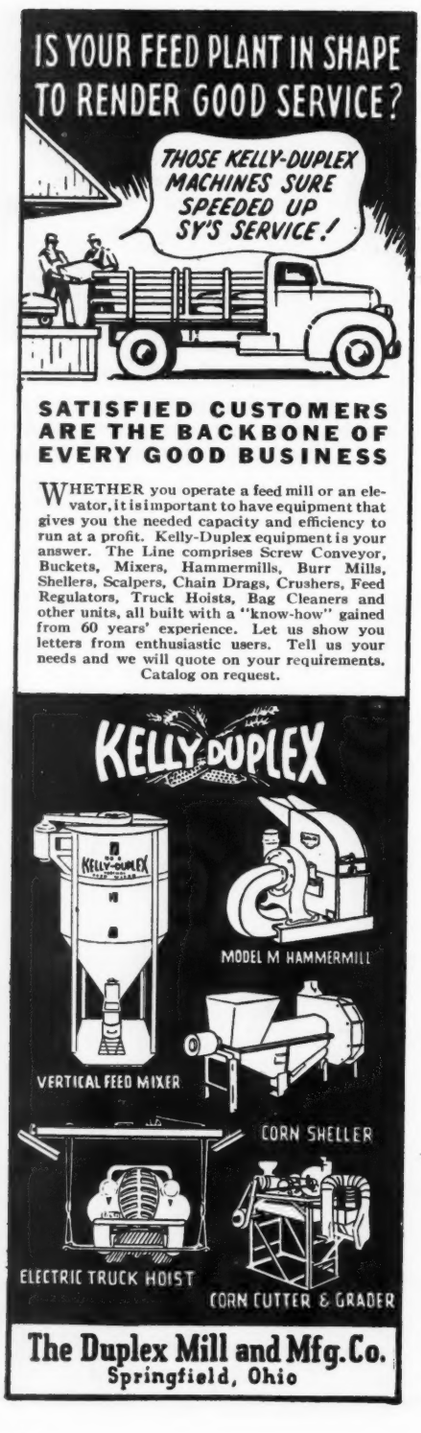
Third quarter distribution of oilseed cake and meals totalled 1,271,944 tons, about 107,000 tons more than during the same July-September period a year ago but 239,353 tons less than April-June distribution this year, reports grain branch of Production and Marketing Administration.

Soybean oil meal distribution for the third quarter totalled 890,071 tons, more than 500,000 tons of this going into Cornbelt states.

Meal distribution during the last quarter of this year and the first 3 months of 1946 is expected to be considerably larger because of seasonal increase in use and the stepping up of crushing operations.

The following table shows distribution in tons by regions for the July-September period:

	Soybean	Cottonseed	Linseed	Peanut	Total
North Atlantic	170,256	12,834	15,819	3,786	202,695
E. North Central	262,746	12,503	23,120	1,347	299,716
W. North Central	238,402	20,690	34,566	190	293,848
South Atlantic	53,269	50,972	1,195	6,777	112,213
South Central	87,806	147,855	2,091	7,617	245,371
Western	77,592	13,523	25,836	1,150	118,101
U. S. Total	890,071	258,377	102,627	20,869	1,271,944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Fats and Oils Allocation Effective January 1, manufacturers of shortening, lard, salad and cooking oils will be restricted to approximately the same package-size distribution they had during the rationing period.

Under a recent amendment to WFO 42, the calendar year, 1944, will be used as the base period in determining the package-size distribution of shortening and salad and cooking oils; 1945 for lard.

This action, says USDA, "will serve to maintain approximately the same proportionate distribution of food fats and oils among institutional, household and industrial users."

Fats and oils supplies will stay tight for some time. USDA estimates there will be enough during the first 6 months of 1946 to supply civilians at an annual rate of about 45 pounds per capita, about 10 percent below the prewar rate.

Secretary Anderson says, "We intend to make every effort to obtain all the vegetable oils possible from the recently liberated Far Eastern areas, and to improve the collection and procurement machinery."

A Shift in OPA Collin S. Gordon of the Quaker Oats Co. is returning to the Office of Price Administration to take over directorship of the food price division just vacated by John F. Gismond, who is going back to the Quaker Maid Co., Inc., of New York City. Gordon was price executive of OPA's cereals, feeds and agricultural chemicals branch from September 1943, to February 1945.

—sbd—

PUBLICATIONS

DISEASES OF FIELD CROPS IN OKLAHOMA, by K. Starr Chester, W. W. Ray, J. Harvey McLaughlin, and D. E. Hoffmaster. Experiment Station Circular C-119. Stillwater, Okla.

Lists the following soybean diseases as being prevalent in Oklahoma: bacterial blight, bacterial pustule, mosaic, pod and stem flight, dry rot, root knot, damping-off and Texas root rot.

Methods of prevention and identification are given for each disease.

FUNCTIONAL PROPERTIES OF SOYA FLOUR AS A BREAD INGREDIENT, by R. T. Bohn and H. H. Favor, *Cereal Chemistry*, July 1945.

Recommends thermophile limitation to not over 50 per gram be added to the specifications of the Food Distribution Administration, Grain Products Branch, to insure a soy flour satisfactory for inclusion in yeast-raised goods.

SOYBEAN PRODUCTION IN WAR AND PEACE, by Edwin G. Strand. 41 pages. Bureau of Agricultural Economics, U. S. Department of Agriculture.

This pamphlet includes considerable statistical information on production of the soybean industry during the years 1924-1944. This includes production and utilization of soybeans, soybean oil meal and soybean oil in the U. S. Average prices obtaining on these products during the past 20 years also are listed.

A substantial section is devoted to the future prospects of soybeans and soybean products. The author believes that the crop should be in a stronger position in competition with other crops than it was before the war, assuming the same price relationships as existed then.

The Coming Relaxation of

COMMODITY MARKET RESTRICTIONS

Two developments of great importance are obviously getting nearer:

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We would like to have an opportunity to consult with you now regarding what specific services we can perform for you. Such a consultation can be arranged at your pleasure, either with one of our executives in our home office at 70 Pine St., N. Y., or one of our offices nearer you, if you prefer. In the latter case, just write us your name and location and we will tell you the proper individual for you to contact.

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How to Use Spergon with Legume Inoculants On Soy Bean Seed

Repeated tests have indicated the high value of Spergon in preventing seed decay and increasing emergence, especially in a cold wet planting season.

Tests also show that Spergon is compatible with legume inoculants and that you may obtain double benefits by treating seed with Spergon and with bacterial cultures. Here's how it's done:

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3. **Use just enough water to make culture cling to seed.**
4. **Plant within two hours after inoculating.**

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In The MARKETS

● ANALYSIS OF SOYBEAN PRODUCTS. A summary of soybean samples analyzed by Woodson-Tenent Laboratories during October.

SOYBEANS

Grand Average Chemical Analyses of Soybeans Grown in: Tennessee, Arkansas, Mississippi, Missouri.

Oil (oil calculated to 14% moisture)	**Oil Yields per bushel***
Grand average 18.0%	8.3 lbs.
Month's highest 19.2	9.1
Month's lowest 15.7	6.9

Average of Soybeans Grown in: Minnesota, Wisconsin, Michigan, Ohio, Indiana, Illinois, Iowa, Kentucky, Virginia, Kansas, Nebraska

Oil (oil calculated to 14% moisture)	**Oil Yields per bushel**
Grand average 17.7%	8.1 lbs.
Month's highest 19.7	9.4
Month's lowest 15.4	6.7

SOYBEAN OIL MEAL

	Moisture	Oil	Protein	Standard
Grand average	11.60%	4.85%	43.49%	57
Month's best	11.96	4.30	45.25	49

SOYBEAN OIL

	F.F.A.	Moisture & Volatile	Gardner Break
Grand average	0.6%	0.14%	0.56%
Month's best	0.6	0.05	0.54

*Calculated 12.50% moisture and 5% oil left in meal.

● COMMODITIES OWNED BY U.S.D.A. Commodity Credit Corporation listed the following in its November 7 summary of commodities currently held by the U. S. Department of Agriculture.

Basic Commodities Inventory (acquired mostly in carrying out price support programs)

Vegetable oils (Lbs.)	17,548,390
Soybeans (Bu.)	2,816,621

Collateral for Loans Held by Commodity Credit Corporation and Lending Agencies

Soybeans (Bu.)	2,461

General Commodities Inventory (purchased in past by Office of Supply)

Margarine (Lbs.)	22,676,778
Shortening (Lbs.)	1,227,937
Vegetable Oils (Lbs.)	2,507,823

● SOYBEAN STOCKS. Production and Marketing Administration's commercial grain stock report.

U. S. Soybeans in Store and Afloat at Domestic Markets (1,000 Bu.)

	Nov. 6	Nov. 13	Nov. 20	Nov. 27
Atlantic Coast		49	107	123
Gulf Coast	312	302	302	66
Northwestern and Upper Lake	421	1,173	1,673	1,984
Lower Lake	5,772	9,191	10,253	10,701
East Central	3,134	5,647	6,813	7,415
West Central, Southwestern & Western	2,872	4,299	4,898	4,937
Pacific Coast				
Total current week	12,511	20,661	24,046	25,226
Total year ago	15,949	19,409	22,645	24,006

Total North American Commercial Soybean Stocks

Current week	12,511	20,661	24,137	25,317
Year ago	16,157	19,604	22,834	24,181

● OCTOBER INSPECTIONS. The quality of the new 1945 soybean crop, as indicated by the October inspections, is above that of the 1944 but slightly below the excellent 1943 crop, according to inspectors' reports to the Grain Branch of the Production and Marketing Administration. Of the October inspections, 93 percent graded No. 2 or better compared with 87 percent last season and 95 percent in October 1943.

Receipts of soybeans inspected the first month of the 1945-46 season totaled 29,377 cars compared with 32,163 cars last season and 33,272 cars in October 1943-44.

● STANDARD SHORTENING SHIPMENTS. By members of Institute of Shortening Mfgrs., Inc., in pounds.

November 3	8,410,199
November 17	8,190,851
November 24	6,984,475